

Please replace the paragraph beginning at page 3, line 22, with the following rewritten paragraph:

--The explanation will be given with reference to formulae. In general, the attractive force  $F$  generated by the coils used in the magnetic bearing is given by the following formula.--

IN THE CLAIMS:

Kindly replace claims 1-7 with the following new claims 8-16:

8. A magnetic bearing apparatus comprising: a rotor; a motor having stator coils for generating a rotary magnetic field for rotating the rotor; magnetic supporting coils for producing a magnetic force for magnetically supporting the rotor in a radial direction thereof; composite magnetic force inferring means for inferring composite vectors of the magnetic force affecting the rotor based on the rotary magnetic field; and magnetic support adjustment means for adjusting the magnetic force produced by the magnetic supporting coils to offset the composite vectors of the magnetic force in the motor.

9. A magnetic bearing apparatus according to claim 8; wherein the rotor is supported by the magnetic supporting

coils at a position at which an axis of rotation of the rotor passes through a gravitational center of the rotor.

10. A magnetic bearing apparatus according to claim 9; wherein the composite magnetic force inferring means comprises a magnetic flux detector for detecting a magnetic flux existing in an air gap between a magnetic pole of the motor and the stator coils, and second inferring means for inferring the composite vectors of the magnetic force affecting the rotor from the magnetic flux detected by the magnetic flux detector.

11. A magnetic bearing apparatus according to claim 10; wherein the motor is a brushless DC motor comprised of a plurality of magnetic poles fixed to the rotor and a plurality of coils wound around the respective magnetic poles.

12. A magnetic bearing apparatus according to claim 8; wherein the motor is a brushless DC motor comprised of a plurality of magnetic poles fixed to the rotor and a plurality of coils wound around the respective magnetic poles.

13. A magnetic bearing apparatus according to claim 12; further comprising a radial position sensor for detecting movement of the rotor in the radial direction thereof; and inferring means for inferring movement of the rotor in the

radial direction based on a positional relationship between the radial position sensor and the motor and an amount of movement of the rotor detected by the radial position sensor; and wherein the composite magnetic force inferring means comprises calculating means for calculating composite vectors of the magnetic force affecting the rotor on the basis of a rotational angle of magnetic poles of the motor, a magnetic field generated by the stator coils of the motor, and the movement of the rotor in the radial direction inferred by the inferring means.

14. A magnetic bearing apparatus according to claim 13; wherein the calculating means calculates the composite vectors of the magnetic force affecting the rotor on the basis of a database of composite vectors of the magnetic force affecting the rotor and a relationship to the radial movement of the rotor, the rotational angle of the magnetic poles, and the magnetic field generated by the stator coils of the motor.

15. A magnetic bearing apparatus according to claim 14; wherein the composite magnetic force inferring means comprises a magnetic flux detector for detecting a magnetic flux existing in an air gap between a magnetic pole of the motor and the stator coils, and second inferring means for inferring the composite vectors of the magnetic force